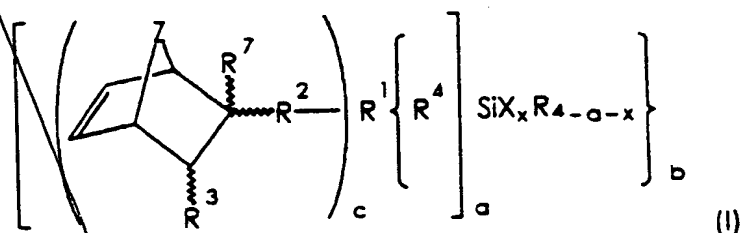


What is claimed is:

1. A process for producing a semipermeable membrane, comprising forming a semipermeable membrane from a low-viscosity to resinous liquid produced by hydrolytic polycondensation of a material comprising at least one compound selected from the group consisting of:

a compound of formula I



wherein

- R = alkyl, alkenyl, aryl, alkylaryl or arylalkyl comprising between 1 to 15 carbon atoms, further optionally comprising an atom or group selected from the group consisting of oxygen atom, sulfur atom, ester, carbonyl, carboxyl, amido, and amino,
- R<sup>1</sup> = alkylene, arylene, arylenealkylene or alkylenearylene comprising between 0 to 15 carbon atoms, further optionally comprising an atom or group selected from the group consisting of oxygen atom, sulfur atom, ester, carbonyl, carboxyl, amido, and amino,
- R<sup>2</sup> = alkylene, arylene, arylenealkylene or alkylenearylene comprising between 0 to 15 carbon atoms, further optionally comprising an atom or group selected from the group consisting of oxygen atom, sulfur atom, ester, carbonyl, carboxyl, amido, and amino,
- R<sup>3</sup> = hydrogen, R<sup>2</sup>-R<sup>1</sup>-R<sup>4</sup>-SiX<sub>x</sub>R<sub>3-x</sub>, carboxyl, alkyl, alkenyl, aryl, alkylaryl or arylalkyl comprising between 1 to 15 carbon atoms, further optionally comprising an atom or group selected from the group consisting of oxygen atom, sulfur atom, ester, carbonyl, carboxyl, amido, and amino,

$R^4 = -(\text{CHR}^6\text{-CHR}^6)_n-$ , where  $n = 0$  or  $1$ ,  $-\text{CHR}^6\text{-CHR}^6\text{-S-R}^5-$ ,  $-\text{CO-S-R}^5-$ ,  $-\text{CHR}^6\text{-CHR}^6\text{-NR}^6\text{-R}^5-$ ,  $-\text{Y-CS-NH-R}^5$ ,  $-\text{S-R}^5$ ,  $-\text{Y-CO-NH-R}^5-$ ,  $-\text{CO-O-R}^5-$ ,  $-\text{Y-CO-C}_2\text{H}_3(\text{COOH})\text{-R}^5-$ ,  $-\text{Y-CO-C}_2\text{H}_3(\text{OH})\text{-R}^5-$  or  $-\text{CO-NR}^6\text{-R}^5-$ ,

$R^5 =$  alkylene, arylene, arylenealkylene or alkylenearylene comprising between 1 to 15 carbon atoms, further optionally comprising an atom or group selected from the group consisting of oxygen atom, sulfur atom, ester, carbonyl, carboxyl, amido, and amino,

$R^6 =$  hydrogen, alkyl or aryl having 1 to 10 carbon atoms,

$R^7 =$  hydrogen, alkyl, alkenyl, aryl, alkylaryl or arylalkyl comprising between 1 to 15 carbon atoms, further optionally comprising an atom or group selected from the group consisting of oxygen atom, sulfur atom, ester, carbonyl, carboxyl, amido, and amino,

$X =$  hydrogen, halogen, hydroxyl, alkoxy, acyloxy, alkylcarbonyl, alkoxycarbonyl or  $\text{NR}''_2$ , where  $\text{R}'' =$  hydrogen, alkyl or aryl,

$Y = -\text{O}-$ ,  $-\text{S}-$  or  $-\text{NR}^6-$ ,

$Z = -\text{O}-$  or  $-(\text{CHR}^6)_m-$ , where  $m = 1$  or  $2$ ,

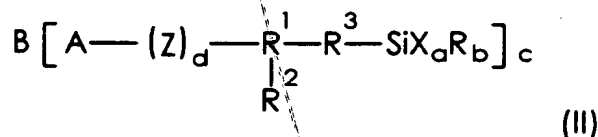
$a = 1, 2$  or  $3$ , where  $b = 1$  if  $a = 2$  or  $3$ ,

$b = 1, 2$  or  $3$ , where  $a = 1$  if  $b = 2$  or  $3$ ,

$c = 1$  to  $6$ ,

$x = 1, 2$  or  $3$ , where  $a+x = 2, 3$  or  $4$ ;

(ii) a compound of formula II



wherein

- B = a straight-chain or branched organic radical having at least one C=C double bond and 4 to 50 carbon atoms,
- R = alkyl, alkenyl, aryl, alkylaryl or arylalkyl comprising between 1 to 15 carbon atoms, further optionally comprising an atom or group selected from the group consisting of oxygen atom, sulfur atom, ester, carbonyl, carboxyl, amido, and amino,
- R<sup>3</sup> = alkylene, arylene, arylenealkylene or alkylenearylene comprising between 0 to 10 carbon atoms, wherein any of these radicals optionally is interrupted by an atom or group selected from the group consisting of oxygen atom, sulfur atom, and amino group,
- X = hydrogen, halogen, hydroxyl, alkoxy, acyloxy, alkylcarbonyl, alkoxycarbonyl or NR<sup>n</sup>, where R<sup>n</sup> = hydrogen, alkyl, aryl or alkylaryl,
- A = O, S or NH if d = 1 and Z = CO and
- R<sup>1</sup> = alkylene, arylene or alkylenearylene comprising between 1 to 10 carbon atoms, wherein any of these radicals optionally is interrupted by an atom or group selected from the group consisting of oxygen atom, sulfur atom, and amino group, and

$R^2 = \text{COOH or H,}$

or

$A = \text{O, S, NH or COO if } d = 1 \text{ and } Z = \text{CHR}', \text{ where}$

$R' = \text{H, alkyl, aryl or alkylaryl, and}$

$R^1 = \text{alkylene, arylene or alkylenearylene comprising between 1 to 10 carbon atoms, wherein any of these radicals optionally is interrupted by an atom or group selected from the group consisting of oxygen atom, sulfur atom, and amino group, and}$

$R^2 = \text{OH,}$

or

$A = \text{O, S, NH or COO if } d = 0 \text{ and}$

$R^1 = \text{alkylene, arylene or alkylenearylene comprising between 1 to 10 carbon atoms, wherein any of these radicals optionally is interrupted by an atom or group selected from the group consisting of oxygen atom, sulfur atom, and amino group, and}$

$R^2 = \text{OH,}$

or

$A = \text{S if } d = 1 \text{ and } Z = \text{CO and}$

$R^1 = \text{N and}$

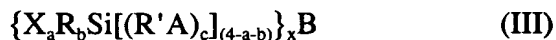
$R^2 = \text{H,}$

$a = 1, 2 \text{ or } 3,$

$b = 0, 1 \text{ or } 2, \text{ where } a+b = 3,$

$c = 1, 2, 3 \text{ or } 4;$

(iii) a compound of formula III

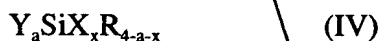


wherein

$A = \text{O, S, PR}^n, \text{ POR}^n, \text{ NHC(O)O or NHC(O)NR}^n,$

- B = a straight-chain or branched organic radical derived from a compound B' having at least one (if  $c = 1$  and  $A = \text{NHC(O)O}$  or  $\text{NHC(O)NR}''$ ) or at least two  $\text{C}=\text{C}$  double bond(s) and 5 to 30 carbon atoms,
- R = alkyl, alkenyl, aryl, alkylaryl or arylalkyl comprising between 1 to 15 carbon atoms, further optionally comprising an atom or group selected from the group consisting of oxygen atom, sulfur atom, ester, carbonyl, carboxyl, amido, and amino,
- R' = alkylene, arylene or alkylenearylene,
- R'' = hydrogen, alkyl, aryl or alkylaryl,
- X = hydrogen, halogen, hydroxyl, alkoxy, acyloxy, alkylcarbonyl, alkoxycarbonyl or  $\text{NR}''_2$ ,
- a = 1, 2 or 3,
- b = 0, 1 or 2,
- c = 0 or 1,
- x = an integer whose maximum value corresponds to the number of double bonds in the compound B' minus 1, or is equal to the number of double bonds in the compound B' if  $c = 1$  and A is  $\text{NHC(O)O}$  or  $\text{NHC(O)NR}''$ ,
- wherein said alkyl and alkenyl radicals optionally are substituted straight-chain, branched or cyclic and comprise 1 to 20 carbon atoms, the aryl optionally is a substituted phenyl, naphthyl or biphenyl, the alkoxy, acyloxy, alkylcarbonyl, alkoxycarbonyl, alkylaryl, arylalkyl, arylene, alkylene and alkylenearyl radical is a derivative of said alkyl or aryl radical;

(iv) a compound of formula IV



wherein

- R = alkyl, alkenyl, aryl, alkylaryl or arylalkyl comprising between 1 to 15 carbon atoms, further optionally comprising an atom or group selected from the group consisting of oxygen atom, sulfur atom, ester, carbonyl, carboxyl, amido, and amino,

- X = hydrogen, halogen, hydroxyl, alkoxy, acyloxy, alkylcarbonyl, alkoxy carbonyl or  $\text{NR}''_2$ , where  $\text{R}''$  = hydrogen, alkyl, aryl or alkylaryl,  
 Y = an organic radical having 1 to 30, preferably 1 to 20 carbon atoms and 1 to 5, preferably 1 to 4 mercapto groups,  
 a = 1, 2 or 3,  
 x = 1, 2 or 3, where  $a + x = 2, 3$  or 4;

and

- (v) a precondensate derived from a compound shown represented in any of formulae I to IV

and wherein said hydrolytic polycondensation material further optionally comprises at least one compound selected from the group consisting of:

- (i) a compound of formula V



wherein

R = alkyl, alkenyl, aryl, alkylaryl or arylalkyl comprising between 1 to 15 carbon atoms, further optionally comprising an atom or group selected from the group consisting of oxygen atom, sulfur atom, ester, carbonyl, carboxyl, amido, and amino,

X = hydrogen, halogen, hydroxyl, alkoxy, acyloxy, alkylcarbonyl, alkoxy carbonyl or  $\text{NR}''_2$ , where  $\text{R}''$  = hydrogen, alkyl, aryl or alkylaryl,

a = 1, 2 or 3; and

- (ii) a precondensate derived from a compound of formula

wherein said hydrolytic polycondensation is conducted by adding a substance selected from the group consisting of water, a solvent, and a condensation catalyst, and wherein said molar ratio of the sum of the compound(s) of formulae I, II, III and IV to the sum of compound(s) of formula V is between 1:0 and 1:20.

2. A process as described in claim 1, that further comprises adding to said liquid a substance selected from the group consisting of an addition-copolymerizable monomer, an addition-copolymerizable oligomer, a curing catalyst, and a pore generating additive.

3. The process as claimed in claim 1, that further comprises adding to said liquid at least one monomer or oligomer that is addition-copolymerizable or that can be subjected to a (poly)addition reaction, optionally, addition of at least one curing agent, and optionally, addition of a pore generating additive.

4. The process as claimed in claim 1, that further comprises curing the membrane by a process selected from the group consisting of thermal curing, radiation-induced curing and chemically induced curing.

5. The process as claimed in claim 3, wherein said liquid is processed into at least one flat or tubular membrane.

6. The process as claimed in claim 5, wherein said membrane is manufactured on a support.

7. The process as claimed in claim 1, wherein said liquid comprises polycondensates derived from at least one compound of formula I, the compound characterized by having a structure according to formula I wherein at least one index of formula I selected from the group consisting of a, b and c has the value 1.

8. The process as claimed in claim 1 wherein said liquid comprises at least one polycondensate derived from at least one compound of formula II or III and wherein radical B has at least one acrylate or methacrylate group.

9. The process as claimed in claim 1, wherein said liquid comprises at least one polycondensate derived from at least one compound of formula VI



wherein

E = -CO-NH-, -CS-NH-, -CH<sub>2</sub>-CH<sub>2</sub>- or -CH<sub>2</sub>-CH(OH)-;

R = as defined in claim 1;

R<sup>5</sup> = alkylene, arylene, arylenealkylene or alkylenearylene comprising between 1 to 15 carbon atoms, wherein optionally one or more radicals is interrupted by an atom or group selected from the group consisting of oxygen atom, sulfur atom, ester, carbonyl, carboxyl, amido, and amino;

R<sup>6</sup> = alkylene, arylene, arylenealkylene or alkylenearylene comprising between 1 to 15 carbon atoms, wherein optionally one or more radicals is interrupted by an atom or group selected from the group consisting of oxygen atom, sulfur atom, ester, carbonyl, carboxyl, amido, and amino;

X = hydrogen, halogen, hydroxyl, alkoxy, acyloxy, alkylcarbonyl, alkoxycarbonyl or NR<sup>2</sup>;

a = 1, 2 or 3;

n = 2, 3, 4 or 5;

x = 1, 2 or 3, where a+x=2, 3 or 4.

10. The process as claimed in claim 1, wherein said liquid comprises polycondensates comprising at least one compound selected from the group consisting of a compound according to formula II or III wherein radical B has at least one acrylate or methacrylate group, and a compound according to the formula VI



wherein

E = -CO-NH-, -CS-NH-, -CH<sub>2</sub>-CH<sub>2</sub>- or -CH<sub>2</sub>-CH(OH)-;

R = as defined in claim 1;

R<sup>5</sup> = alkylene, arylene, arylenealkylene or alkylenearylene comprising between 1 to 15 carbon atoms, wherein optionally one or more radicals is interrupted by an atom or



group selected from the group consisting of oxygen atom, sulfur atom, ester, carbonyl, carboxyl, amido, and amino;

*B1*  
 $R^6$  = alkylene, arylene, arylenealkylene or alkylenearylene comprising between 1 to 15 carbon atoms, wherein optionally one or more radicals is interrupted by an atom or group selected from the group consisting of oxygen atom, sulfur atom, ester, carbonyl, carboxyl, amido, and amino;

$X$  = hydrogen, halogen, hydroxyl, alkoxy, acyloxy, alkylcarbonyl, alkoxycarbonyl or  $NR''_2$ ;

$a$  = 1, 2 or 3;

$n$  = 2, 3, 4 or 5;

$x$  = 1, 2 or 3, where  $a+x=2, 3$  or 4.

11. The process as claimed in claim 1, wherein said liquid further comprises at least one organic compound selected from the group consisting of a compound having at least one mercapto group, a compound having at least one C=C double bond, and a compound having at least one amino group.

12. The process as claimed in claim 1, wherein said liquid comprises at least one polycondensate or oligocondensate having at least one C=C double bond, the polycondensate or oligocondensate being derived from at least one organically modified and hydrolytically condensable silane.

13. The process as claimed in claim 12, wherein said polycondensate or oligocondensate has at least one amino group and is derived from at least one organically modified, hydrolytically condensable silane.

14. The process as claimed in claim 1, wherein said liquid comprises at least one pore generating additive selected from the group consisting of at least one salt, additional liquid, blowing agent, and porous filler.

15. The process as claimed in claim 14, which further comprises removing at least one pore generating additive from said membrane by dissolution, thermal treatment or thermal cracking.

16. A semipermeable membrane produced by a process as claimed in claim 1.

17. A process selected from the group consisting of gas separation, reverse osmosis, electrodialysis, dialysis, pervaporation, microfiltration, ultrafiltration and hyperfiltration, wherein said process comprises effecting a separation using the semipermeable membrane as claimed in claim 16.

[illegible]

~~old~~

and C3.

